UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 93280

CR NO. 119

OVER THE

EAST BRANCH OF THE RAT ROOT RIVER

DISTRICT 1 - KOOCHICHING COUNTY

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 3512(CEI 15)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected below water at Bridge No. 93280, the East and West Abutments and Piers 1 and 2, were found to generally be in good condition with only minor checking of the timber piles below water. Above water, the checking on the timber piles increased in size, and decreased pile cap bearing was observed at the West Abutment. The channel bottom is presently stable with no significant scour or appreciable changes since the previous inspection.

INSPECTION FINDINGS:

(A) Minor 1/4 inch deep checking was observed on the timber piles in random areas below the waterline. Above water, areas of larger checking and splitting were observed on random timber piles.

(B) The West Abutment pile cap has rotated to the west and was typically only bearing on approximately 75 percent of each pile top.

(C) The timber diagonal cross braces at Pier 1 were split through the fasteners at the upstream and downstream piles below the waterline.

(D) Two 1 inch wide gaps with 3 inches of penetration were observed in the horizontal timber planking of the West Abutment.

(E) There was some light timber drift on the channel bottom around the piles at Piers 1 and 2.

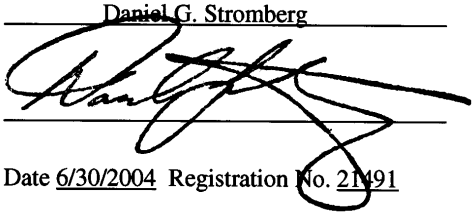
RECOMMENDATIONS:

(A) The diagonal timber cross brace, that is split through the fasteners at Pier 2, should be replaced during routine maintenance.

(B) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

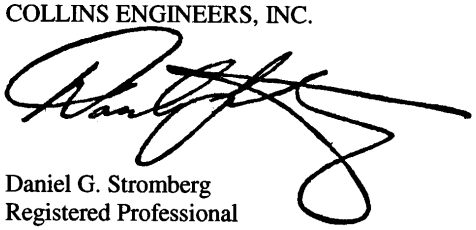
Daniel G. Stromberg



Date 6/30/2004 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.



Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 93280

Feature Crossed: The East Branch of the Rat Root River

Feature Carried: CR No. 119

Location: District 1 - Koochiching County

Bridge Description: The superstructure is a three span, timber stringer/deck bridge. The superstructure is supported by two timber pile abutments and two timber pile piers. The piers are numbered 1 and 2 from east to west.

2. INSPECTION DATA

Professional Engineer Diver: Daniel G. Stromberg
State of Minnesota, P.E., No. 21491

Dive Team: Michelle D. Koerbel, Matthew J. Lengyel

Date: August 26, 2002

Weather Conditions: Sunny, ± 65^{o} F

Underwater Visibility: ± 3.0 Feet

Waterway Velocity: Negligible/None

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: East and West Abutments, and Piers 1 and 2.

General Shape: The piers and abutments consist of six 1 foot diameter timber piles with a square timber pile cap. The piers have timber cross bracing attached to the piles. The embankments are contained behind the abutments by timber lagging and adjacent timber and lagging wingwalls.

Maximum Water Depth at Substructure Inspected: Approximately 10.5 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pile cap at the north end of Pier 1.

Water Surface: The waterline was approximately 4.8 feet below reference.
Assumed Waterline Elevation = 95.2.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 7

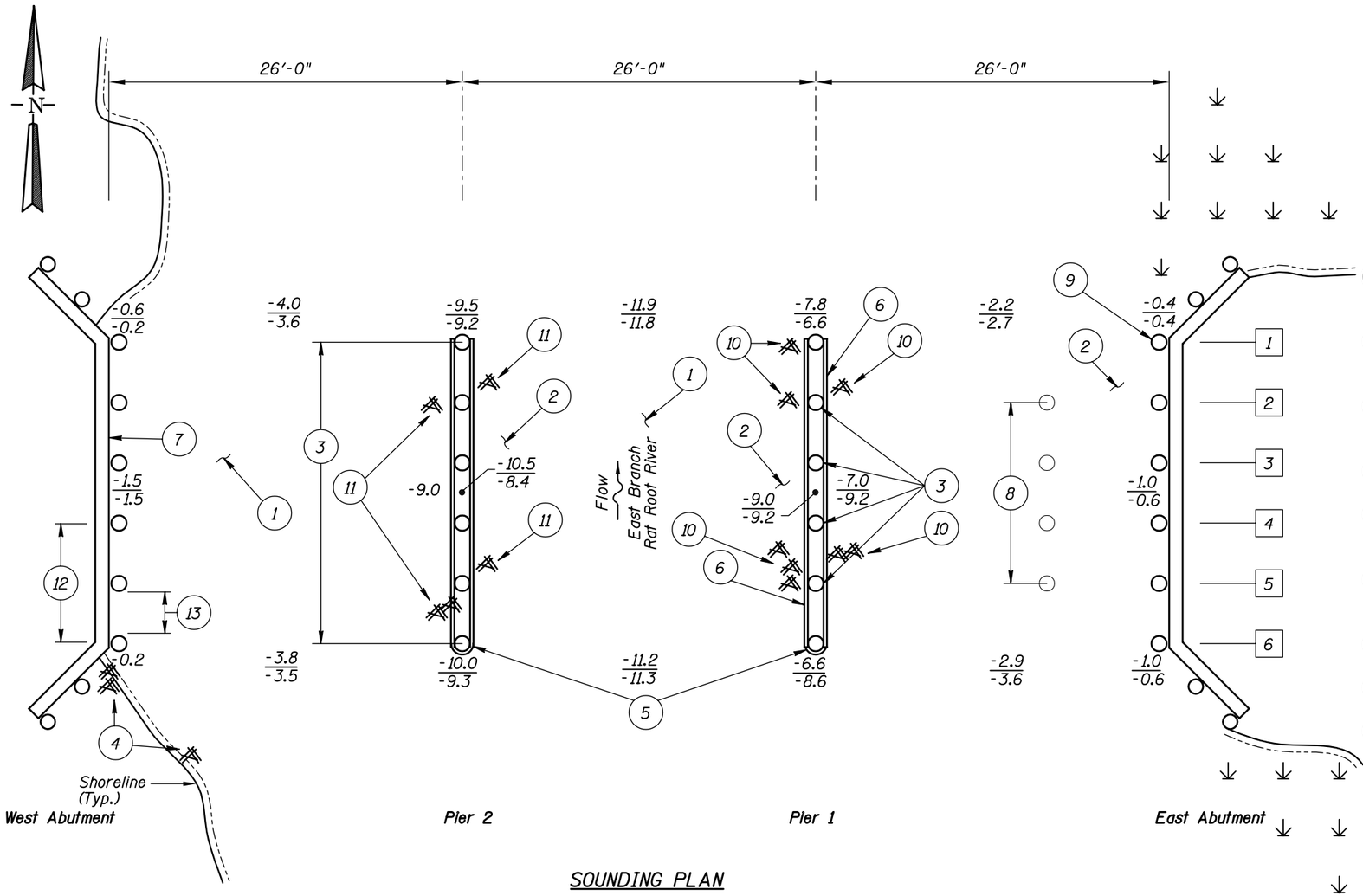
Item 61: Channel and Channel Protection: Code 7

Item 92B: Underwater Inspection: Code B/08/02

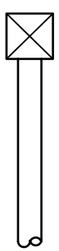
Item 113: Scour Critical Bridges: Code K/95

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

_____ Yes __X__ No



SOUNDING PLAN



TYPICAL END VIEW OF PIERS

GENERAL NOTES:

1. Piers 1 and 2, and the East and West Abutments were inspected below water.
2. At the time of inspection on August 26, 2002, the waterline was located approximately 4.8 feet below the top of pier cap at the north end of Pier 1. Since insufficiant bridge elevation information was available a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation was 95.2.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at mid point intervals between the substructure units.

INSPECTION NOTES:

1. The channel bottom material consisted of a soft, silty, sandy clay with 6 inches to 1 foot of probe rod penetration.
2. The channel bottom material around Piers 1 and 2 and the East Abutment consisted of 6 inch to 12 inch diameter riprap.
3. Piles exhibit random checking from the waterline to 3 feet below the waterline with up to 1/4 inch maximum width.
4. Light accumulation of timber debris along shoreline.
5. Curved steel ice-breaker plates from just below the pile caps down to approximately 1 foot below the waterline were attached to the south face of the outside piles.
6. Diagonal braces split and fasteners pulled through at Piles 1, 2, and 3 on the east side of Pier 2 and Piles 5 and 6 on the west side of Pier 2.
7. Pile cap slightly rotated back with 75 percent typical bearing on the piles.
8. Row of old piles cut of at 2 inches above the channel bottom.
9. A large vertical split approximately 2 feet high by 1/4 inch wide, with 1 inch penetration located at top of pile.
10. Light accumulation of timber debris at Piles 1, 2, and 5, up to 6 inches diameter pieces, typically extending 3 feet above channel bottom.
11. Light accumulation of timber debris at Piles 2 and 5, up to 6 inches diameter pieces, typically extending 3 feet above channel bottom.
12. Escaping fill was observed at 1 inch gap in horizontal planking, 4 feet above mudline, with 3 inches maximum penetration.
13. Escaping fill was observed at 1 inch gap in horizontal planking, 3 feet above mudline, with 3 inches maximum penetration.

Legend

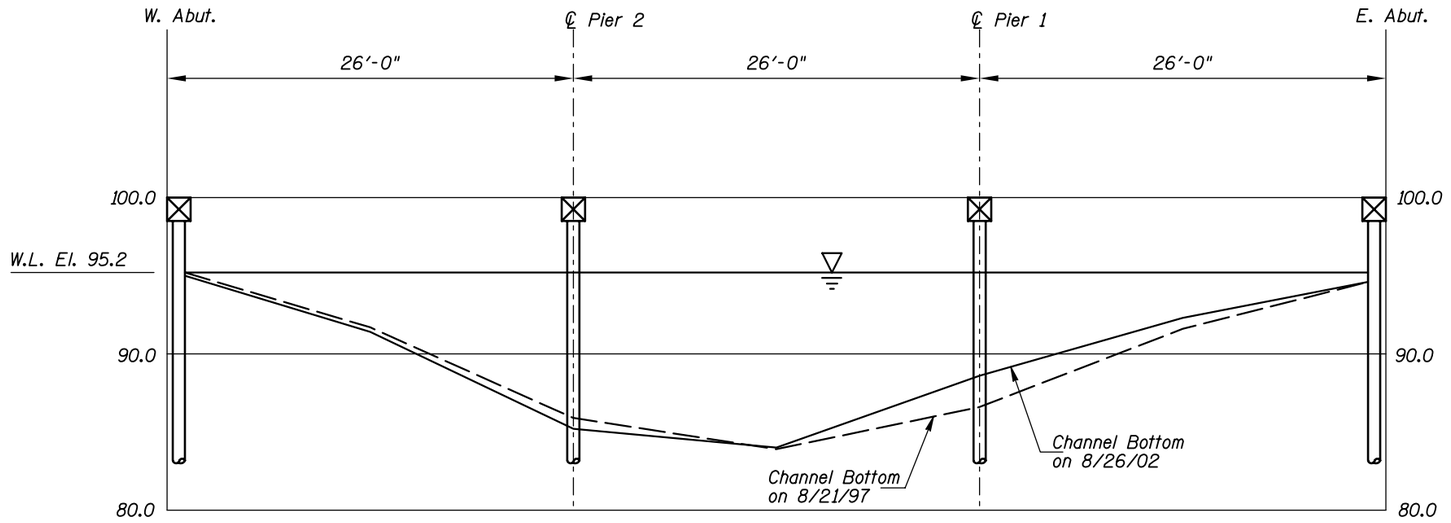
-2.0 / -5.2	Sounding Depth from Waterline (8/26/02) / Sounding Depth from Waterline (8/21/97)
○	Timber Pile
6	Pile Designation Number
	Timber Debris
	Grassy Vegetation

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

STRUCTURE NO. 93280
OVER THE EAST BRANCH OF THE RAT ROOT RIVER
DISTRICT 1, KOOCHICHING COUNTY

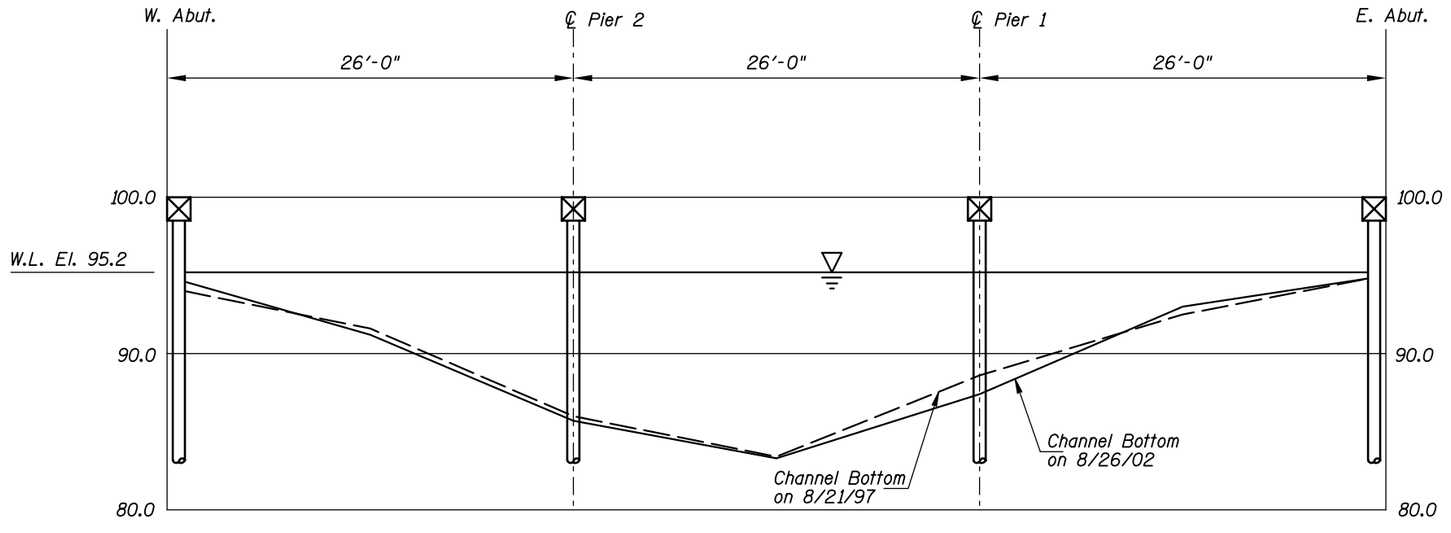
INSPECTION AND SOUNDING PLAN

Drawn By: PRH	COLLINS ENGINEERS, INC.	Date: AUG. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: NTS
Code: 35120015		Figure No.: 1



UPSTREAM FASCIA PROFILE

Vertical Scale: 1"=10′-0"



DOWNSTREAM FASCIA PROFILE

Vertical Scale: 1"=10′-0"

Note:

Refer to Figure 1 for General Notes.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

STRUCTURE NO. 93280
OVER THE EAST BRANCH OF THE RAT ROOT RIVER
DISTRICT I, KOOCHICHING COUNTY

UPSTREAM AND DOWNSTREAM FASCIA PROFILES

Drawn By: PRH	COLLINS ENGINEERS, INC.	Date: AUG. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: NTS (U.O.N.)
Code: 35120015		Figure No.: 2

Photograph 1. Overall View of the Structure, Looking Northeast.

Photograph 2. View of Pier 1, Looking Northwest.

Photograph 3. View of Pier 2, Looking Northeast.

Photograph 4. View of Top of West Abutment, Looking South.

Photograph 5. View of Top of East Abutment, Looking North.

Photograph 6. View of Split in Cross Bracing at Pier 1, Looking Southwest.

Photograph 7. View of Typical Checking of Piling at East Abutment, Looking Northeast.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: August 26, 2002
ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E.
BRIDGE NO: 93280 WEATHER: Sunny, " 65° F
WATERWAY CROSSED: The East Fork of the Rat Root River
DIVING OPERATION: X SCUBA SURFACE SUPPLIED AIR
OTHER
PERSONNEL: Michelle D. Koerbel, Matthew J. Lengyel
EQUIPMENT: Scuba, U/W Light, Scraper, Lead Line, Probe Rod, Camera
TIME IN WATER: 7:30 A.M.
TIME OUT OF WATER: 8:10 A.M.
WATERWAY DATA: VELOCITY Negligible/None
VISIBILITY " 3.0 feet
DEPTH 10.5 feet maximum at Pier 2
ELEMENTS INSPECTED: Piers 1 and 2, East and West Abutments
REMARKS: Overall, the timber piles and backwall/wingwall planking was in good, sound, and firm condition below water with random 1/4 inch wide checking. Above water, the timber components have more defects including some larger checks/splits and reduced pile cap/pile bearing at the West Abutment. The West Abutment exhibited up to 1 inch gapping between the planking with evidence of fill escaping. The bracing at Pier 1 was split through the fasteners at piles 1, 2, and 3 along the east downstream side of Pier 1, and through the fasteners at piles 5 and 6 on the west upstream side of Pier 1. Light timber drift was on the channel bottom around the piles of Piers 1 and 2.

FURTHER ACTION NEEDED: X YES _____ NO

The timber cross bracing member that exhibited cracking at Pier 1 should be replaced during routine maintenance to reestablish lateral stability to the pier.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 93280
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Daniel G. Stromberg, P.E. 21491
WATERWAY CROSSED The East Branch of the Rat Root River

INSPECTION DATE August 26, 2002

NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

			SUBSTRUCTURE						CHANNEL					GENERAL					
UNIT REFERENCE NO.		MAXIMUM DEPTH OF WATER	PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER (BRACING)	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER (BACKWALLS)
	UNIT DESCRIPTION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	7
	East Abutment	1.0’	7	7	N	9	N	7	8	8	8	N	8	N	N	7	8	N	N
	Pier 1	9.0’	7	7	N	9	6	6	8	N	N	7	7	N	N	7	8	N	N
	Pier 2	10.5’	7	7	N	9	7	7	8	N	N	7	7	N	N	7	8	N	N
	West Abutment	1.5’	7	7	N	6	N	7	8	8	8	N	8	N	N	7	8	N	6

*UNDERWATER PORTION ONLY

REMARKS: Overall, the timber piles and backwall/wingwall planking was in good, sound, and firm condition below water with random 1/4 inch wide checking. Above water, the timber components have more defects including some larger checks/splits and reduced pile cap/pile bearing at the West Abutment. The West Abutment exhibited up to 1 inch gapping between the planking with evidence of fill escaping. The bracing at Pier 1 was split through the fasteners at piles 1, 2, and 3 along the east downstream side of Pier 1, and through the fasteners at piles 5 and 6 on the west upstream side of Pier 1. Light timber drift was on the channel bottom around the piles of Piers 1 and 2.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO.
USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.